

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listing of the claims in the application:

LISTING OF THE CLAIMS:

Claims 1-90 (Canceled)

Claim 91. (Currently amended) An *in vitro* method of making linear sequence variants from at least one heteroduplex polynucleotide wherein said heteroduplex has at least two non-complementary nucleotide base pairs separated by complementary nucleotide base pairs, said method comprising:

a)[.] preparing at least one heteroduplex polynucleotide, the heteroduplex having first and second strands;

b)[.] combining said heteroduplex polynucleotide with enzymes ~~consisting essentially of comprising~~ an effective amount of a plant-derived mismatch recognizing and mismatch-directed endonuclease ~~that cleaves at the mismatched nucleotides~~, an enzyme or enzymes with 3' to 5' exonuclease activity, and an enzyme or enzymes with polymerase activity;

c)[.] allowing sufficient time for the percentage of complementarity to increase, wherein at least one or more sequence variants are made, thereby increasing diversity in a population of polynucleotides; and

d)[.] separating and recovering at least one sequence variant having a sequence different from either polynucleotide strand in the heteroduplex.

Claim 92. (Previously presented) The method of claim 91 wherein said endonuclease is added first, said enzyme or enzymes having 3' to 5' exonuclease activity is added second, and said enzyme or enzymes having polymerase activity is added third.

- Claim 93. (Previously presented) The method of claim 91 wherein said enzymes having exonuclease activity, polymerase activity, and endonuclease are added concurrently.
- Claim 94. (Previously presented) The method of claim 91 in step (b) further comprising ligase activity.
- Claim 95. (Previously presented) The method of claim 93 in step (b) further comprising ligase activity.
- Claim 96. (Previously presented) The method of claim 94 wherein said ligase is T4 DNA ligase, *E. coli* DNA ligase, or Taq DNA ligase.
- Claim 97. (Previously presented) The method of claim 91 wherein said enzyme_{with} polymerase activity is T4 DNA polymerase.
- Claim 98. (Previously presented) The method of claim 91 wherein said 3' to 5' exonuclease activity and said polymerase activity are provided by a single enzyme selected from the group consisting of: T4 DNA polymerase, T7 DNA polymerase, *E. coli* Pol I, and Pfu DNA polymerase.
- Claim 99. (Previously presented) The method of claim 91 wherein said polymerase activity and said 3' to 5' exonuclease activity are provided by *E. coli* Pol I.
- Claim 100. (Previously presented) The method of claim 91 wherein an effective amount of said endonuclease is provided by CEL I or SP nuclease.
- Claim 101. (Previously presented) The method of claim 91 wherein complementarity is complete yielding a homoduplex polynucleotide.

Claim 102. (Previously presented) The method of claim 91 wherein at least 2 different polynucleotide sequence variants are formed and recovered.

Claim 103. (Previously presented) The method of claim 91 further comprising screening or selecting a population of sequence variants for a desired functional property.

Claim 104. (Currently amended) The method of claim 103 further comprising selecting a sequence variant that has a different desired functional property from any parent polynucleotide.

Claim 105. (Previously presented) The method of claim 91 wherein said at least one heteroduplex polynucleotide has at least three non-complementary nucleotide base pairs separated by complementary nucleotide base pairs and at least 4 different sequence variants are made.